DOCUMENT RESUME

ED 410 889 HE 030 486

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TITLE Graduates Who Never Planned To Graduate: A Community College's Impact on Student Aspirations. AIR 1997 Annual Forum Paper.
PUB DATE 1997-05-21
NOTE 25p.; Paper presented at the Annual Forum of the Association for Institutional Research (37th, Orlando, FL, May 18-21, 1997).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Aspiration; *Academic Persistence; Associate Degrees; Course Selection (Students); Degrees (Academic); *Goal Orientation; Graduation; Mathematical Aptitude; School Demography; School Holding Power; *Student Attitudes; Student Motivation; *Two Year College Students; Two Year Colleges; Withdrawal (Education)
IDENTIFIERS *AIR Forum; Tinto Model

ABSTRACT

This study used the Tinto Model to examine characteristics of community college students without initial plans to graduate, but who did eventually receive an Associate's degree from the institution. In 1991, a large midwestern community college began asking enrollees whether they planned to graduate. By 1994, sizable numbers of graduates had responded, with surprising results: over one-third of graduates had not initially planned to complete an Associate degree. Data from existing student records for 2,650 Associate Degree recipients in fiscal year 1994-95 were examined for differences between graduates who initially did not intend to graduate and graduates who had originally intended to graduate. Matriculation experiences, including completing the initial math course during the first year of study, increased the odds of being in the group that changed aspirations when effects of age, level of math course, and transfer plans were controlled. Characteristics of the students most likely to change their intention and graduate included: younger age, no plans to transfer, completion of math requirements in the first year, and no enrollment in algebra prep or remedial math. Five tables and six figures detail the study's findings. (Contains 10 references.) (Author/LEE)

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Graduates Who Never Planned To Graduate: A Community College's Impact on Student Aspirations

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Presented at
Session 36-269
The Association for Institutional Research
37th Annual Forum
May 21, 1997
Lake Buena Vista, Florida

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This paper was presented at the Thirty-Seventh Annual Forum of the Association for Institutional Research held in Orlando, Florida, May 18-21, 1997. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum Papers.

Jean Endo
Editor
AIR Forum Publications

Graduates Who Never Planned To Graduate:

A Community College's Impact on Student Aspirations

Abstract

In 1991, a large, midwestern community college began asking enrollees whether they planned to graduate. By 1994, sizable numbers of **graduates** had responded, with surprising results--over one-third had **not** planned to complete a degree. Data from existing student records for 2,650 Associate Degree recipients in FY94-95 were examined for differences between graduates who initially did not intend to graduate and graduates who did intend to graduate. Matriculation experiences, including completing the initial math course during the first year of study, increased the odds of being in the group that changed aspirations--when effects of age, level of math course, and transfer plans were controlled.

Graduates Who Never Planned To Graduate:

A Community College's Impact on Student Aspirations

Introduction

In 1991, a large, midwestern community college began asking enrollees whether they planned to complete a degree at the college. By 1994, sizable numbers of **graduates** had responded to this query, with surprising results--almost one-third had **not** planned to complete a degree. For these students, college had a dramatic impact on their aspirations. Understanding the factors that led to this change could give us tools to enhance or expand such opportunities to other students. The present study is an exploratory study of existing student data to identify the factors that made such a profound difference.

Review of Literature

Pascarella and Terenzini (1991) pose six questions for studies on *How College Affects Students*. "Within-College Effects"--Question 4 ("What evidence exists on effects of different experiences within the same institution?") and "Conditional Effects of College"--Question 5 ("What evidence is there that the collegiate experience produces conditional, as opposed to general, effects on student change or development?") (1991; pp. 7-8) have particular relevance for the present study. As discussed in the following section, two groups of graduates--those who had planned to graduate and those who had not--are compared in order to address these questions. Tinto (1993) proposed a framework for conceptualizing the college experience as a process from admission to

degree completion (or departure without completion) in his longitudinal Model of Institutional Departure:

> ...a longitudinal process of interactions between an individual with given attributes, skills, financial resources, prior educational experiences, and dispositions...and other members of the academic and social systems of the institution. The individual's experience in those systems, as indicated by his/her intellectual (academic) and social (personal) integration, continually modifies his or her intentions and commitments. Positive experiences--that is, integrative ones--reinforce persistence through their impact upon heightened intentions and commitments both to the goal of college completion and to the institution in which the person finds him/herself. (Tinto, 1993; pp. 113, 115)

Reviewing the student record system for variables that bear upon this complex process, obvious choices are course and matriculation data. In a study of transfers to public Illinois universities, Reis (1995) found that math course-taking patterns, including postponing math courses, influenced transfer performance. Astin (1993) found number of courses taken that emphasize writing skills had "significant positive effects on all areas of self-reported growth," (p.377) including critical thinking skills. As a "first cut," initial math and composition courses were selected for further examination in the present study.

Methods

Data

Data from existing student records for Associate Degree recipients in FY94 and FY95 were examined for differences between graduates who initially did not intend to complete a degree and graduates who had entered the institution with plans to complete a degree. A total of 2,650 students[1] received an associate degree during these two years, 67% a "transfer" degree--Associate in Arts (A.A.) or Associate in Science (A.S.)--and 30% the "occupational" degree, Associate in Applied Science (A.A.S.).[2] Thirty-two percent of graduates had indicated upon registration that they had no plans for a degree from this college.

Variables

Portions of Tinto's Model of Institutional Departure (Tinto, 1993; p. 114), with its six stages--Pre-Entry Attributes, Goals/Commitments on Admission, Institutional Experiences, Academic/Social Integration, Later Goals/Commitments, and Outcome, could be approximated with variables available in the student record system.

The demographic variables--sex, age, and ethnicity (coded for purposes of this study as Caucasian, non-Caucasian)--constituted the sole "**pre-entry attributes**" available. Information about previous education was also obtained, but this was not treated as a variable in the present study, which included only individuals who were high school graduates and first-time college students.

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[1] Who entered the community college without previous college experience.

[2] Two percent received the Associate in General Studies degree.

The pertinent **admission goal** featured in the present study was the student's plan to graduate or not to graduate. Since 1993 students have also been asked whether they plan to transfer to a four-year college; about 60% of graduates in the sample have answered this question.

Matriculation variables, which constitute the "**institutional experience**" variables from Tinto's model, include type of degree, grade point average, number of terms at college, major at admission, and major at graduation. Also available is information about course taking patterns. The present study examined variables surrounding mathematics and English courses, particularly the student's first math or English course--what level it was, when or whether in the program it occurred, and the grade received. All of these fall within what Tinto classified as formal Academic System measures of institutional experience and disclose indirect information about the graduate's actual experiences while enrolled at college.

Later goals/commitments may be inferred by examining whether or not the student changed graduation plans and whether the graduation major differed from the admission major. The **outcome** (successful) for all participants in the study was the completed degree. Table 1 outlines the variables in the study, their attributes and coding, and their location within Tinto's Model of Institutional Departure (1993).

Math and English Course-Taking Patterns

As the most revealing components of institutional experience investigated in the present study, the initial math and English courses deserve further discussion. Among high school graduates who entered[3] with no previous college experience, 56% took a math course. Of these, over one-third began in remedial math. Another third began in Math 110, a preparatory course for college

[3] Fall 1991 cohort, the first entering cohort to be asked about graduation plans.

Table 1. Variables and Their Relationship to Tinto's Model of Institutional Departure (1993)

Institutional Departure Variables	Code
Pre-Entry Attributes	
• Gender	
Females	0
Males	1
• Ethnicity	
Caucasian	0
Non-Caucasian	1
• Age (years)	
Goals at Admission	
• Graduation Plans	
Do plan to graduate	0
Do **not** plan to graduate	1
• Transfer Plans	
No Information	0
Do **not** plan to transfer	1
Do plan to transfer	2
Institutional Experiences	
Academic System (formal)	
• Level of First Math Course	
Remedial	1
Specialized Occupational	2
Algebra Prep	3
College Algebra and Related	4
Calculus	5
• Level of First Composition Course	
Remedial	1
Composition 101	2
Advanced English	3
• Success in First Math Course	
Grade of "D", "F" or "W"	0
Grade of "C" or "B"	1
Grade of "A"	2
• Success in First Composition Course	
Grade of "D", "F" or "W"	0
Grade of "C" or "B"	1
Grade of "A"	2
• When Enrolled in First Math	
During First Year	0
After First Year	1
• When Enrolled in First Composition	
During First Year	0
After First Year	1

Institutional Departure Variables *(Continued)*	Code
Personal/Normative Integration (unmeasured)	
Later Goals (inferred)	
• Changed Graduation Plans (Graduated)	
• Changed Major	
Grad Major Same as Admit Major	0
Grad Major Differs from Admit Major	1
Outcome	
• Graduation	

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algebra. An additional 23% took one of the specialized courses geared to a specific occupational purpose (business, technology, etc.). The remaining 10% enrolled first in college algebra or a more advanced course. Seventy percent completed their first math course successfully, with a grade of "C" or better.

The graduates--an **exiting** cohort--exhibit a slightly different pattern in their first math course. Nearly 40% of those completing a transfer degree (A.A. or A.S.) began in Math 110, the college algebra preparatory course; and 83% completed their first math course successfully. Fifty-two percent of those completing the occupational degree (A.A.S.) began in one of the specialized occupational math courses. Almost 90% completed their first course successfully.

Over 60% of high school graduates entering with no previous college enroll in an English composition course--nearly 85% in English 101, the initial college-level composition course. Among graduates, the percentage initially enrolling in English 101 is 5 to 10 percentage points lower as proportionately more of these students began in advanced English courses. There was relatively little difference between transfer and occupational graduates in initial English composition course patterns.

Design Issues

Unlike traditional comparative or experimental studies that begin with comparable groups who then diverge to different outcomes as a result of differential experiences, the present study examines two groups of students who **began** with different goals--intending to graduate or intending not to graduate--and emerged with identical outcomes, the associate degree. Thus the usual logic of the experiment will not work here. We cannot examine the outcomes to estimate the effects of differential treatments. Yet something did happen to make one set of graduates

change their minds about obtaining a degree. If what happened is at all reflected in the pre-entry and institutional experience variables available--differences that might be detected by comparing the two groups of graduates--we may be able to make inferences about the factors that led the group who planned not to graduate to change their plans.

Because the dependent variable, intent to graduate, is dichotomous, logistic regression is a viable approach to this question (Norušis, 1993; Walsh, 1987). A logistic regression model estimates the log odds (or logit) of an event, such as changing one's graduation plans, in terms of a linear combination of the explanatory variables.[4]

$$\log_e \left(\frac{\text{prob(event)}}{\text{prob(no event)}} \right) = B_0 + B_1X_1 + \ldots + B_pX_p; \text{ where} \qquad (1)$$

$X_1 \ldots X_p$ are pre-entry and institutional experience explanatory variables; and

$B_0 \ldots B_p$ are parameters to be estimated. And where,

$$\text{prob(no event)} = 1 - \text{prob(event)} \qquad (2)$$

In this case, "no event" consists of being in the group that intended to graduate, and did.

Each B_i coefficient may "be interpreted as the change in the log odds associated with a one-unit change in the independent variable." (Norušis, 1993, p. 6). B_0, the intercept, "represents an overall average of the logits for all the combinations of the independent variables." (Agresti and Finlay, 1986, p. 487).

[4] The present study used SPSS for Windows, Release 6.1, to fit the model.

To translate the log odds into odds (i.e., the ratio of the probability of the "event" to the probability of "no event"), one computes the antilog of equation 1:

$$e^{B_0 + B_1X_1 + \ldots\ldots + B_pX_p} = e^{B_0} * e^{B_1X_1} * \ldots\ldots * e^{B_pX_p} \quad (3)$$

From the odds, one can compute the probability of the event of interest as

$$\text{prob(event)} = 1/(1 + e^{-(B_0 + B_1X_1 + \ldots\ldots + B_pX_p)}). \quad (4)$$

Results

Thirty-two percent of graduates had not planned to complete a degree when they first enrolled at the college--a figure that varied slightly by degree. Table 2 summarizes available information about the graduates. The large drop in percentages enrolling in algebra prep as their first math course for A.G.S. and A.A.S. graduates was due to differences in math requirements for these degrees--specifically, college algebra is not required in these programs, while it is required for A.A. and A.S. degrees.

Table 3 shows the distribution by graduation plans for pre-entry and institutional experience variables. Perhaps the most striking finding is how similar the two groups of graduates were, especially transfer degree graduates. Men were as likely as women to be in either group. The two groups differed one year in average age--those who changed aspirations being younger--enough to be statistically significant (were these random samples). Students who changed graduation plans (did **not** plan to graduate) were less likely to have intended to transfer, and they obtained their degrees a bit more quickly. They were more likely to start in higher level math courses and to take math and English during their first year. On the other hand, the cumulative grade point

averages were almost identical for the two groups, nor did they differ in the degree of success in their first math--especially A.A./A.S. degree recipients--or in first composition courses.

Table 2. Academic And Demographic Characteristics For Selected FY94 & FY95 Graduates

	A.A.	A.S.	A.G.S.	A.A.S.	ALL
Degree Recipients	1448	337	58	807	2650
Age--Mean	24.1	24.2	32.9	30.9	26.4
Median	22	22	30	27	23
% Female	57	56	71	62	59
% Minority	8	15	3	12	10
% Did **Not** Plan to Graduate	35	33	28	25	32
% Planned to Transfer	66	72	33	20	52
Average G.P.A.	3.06	3.19	3.09	3.24	3.13
Terms at C.O.D.[1]	10	11	15	13	11
% Changing Major[2]	89	89	100	81	87
% Algebra Prep or Beyond	62	77	22	22	51
% Advanced English	14	19	26	14	15
% "A" in First Math	20	36	31	29	25
% "A" in First English	40	53	48	35	40
% Math in First Year	47	50	22	26	40
% English in First Year	66	59	38	33	54

[1] **Median** value of total terms at C.O.D.
[2] Admission major different from graduation major.

NOTE: A.A. Associate in Arts
A.S. Associate in Science
A.G.S. Associate in General Studies
A.A.S. Associate in Applied Science

Initial attempts to fit a multivariate model, showed, not surprisingly, that models that fit occupational degree (A.A.S.) students did not fit transfer degree (A.A./A.S.) students, and vice-versa. The paper will focus first on models for the A.A./A.S. graduates.

Table 3. A Comparison of Graduates Who Planned to Graduate and Graduates Who Did NOT Plan to Graduate, by Selected Variables

Variables	A.A./A.S. Plan to Grad?		A.A.S. Plan to Grad?	
	Yes	No	Yes	No
Number	1164	621	604	203
Age--Mean	24.6	23.2	31.2	29.9
Median	22	21	28	26
% Female	57	58	65	56
% Minority	8	11	11	16
% Planned to Transfer	72	56	20	22
Average G.P.A.	3.08	3.10	3.24	3.25
Terms at C.O.D.[1]	11	9	14	11
% Changing Major[2]	90	87	81	79
% Algebra Prep. or Beyond	62	69	21	25
% Advanced English	15	15	15	14
% "A" in First Math	23	23	32	21
% "A" in First English	42	45	36	34
% Math in First Year	44	54	25	29
% English in First Year	61	71	31	37

[1] **Median** value of total terms at C.O.D.
[2] Admission major different from graduation major.

A.A. and A.S. Graduates

The models shown in Table 4 were developed in three stages using a forward stepwise selection method.[5] The three pre-entry demographic variables were entered first, followed by the institutional experience variables. Then two-way interaction terms between the two sets of variables (pre-entry and institutional experience), between the pre-entry variables and transfer plans, as well as between the two "success" variables and other course variables were added. As

[5] The Wald statistic was used to determine variables to be removed; the final selection was then confirmed using the likelihood-ratio test. (See Norušis (1993), p. 15)

can be seen by their absence in the two final models in Table 4, gender and ethnicity did not differentiate graduates who planned to graduate from those who did not; neither did the variables connected with initial English composition course and success in first math course.

What did matter was the level of the first math course, which interacted with age, and whether it was taken during the first year or later in the program, and whether the student had planned to transfer to a four-year school. Overall, although a significant improvement over a model with only the constant, the two models fit the data with only moderate success. Sixty-six percent of the cases were accurately classified as to graduation plans. Unfortunately, only 7% of those who did not plan to graduate were correctly classified by Model 1. Model 2, by adding transfer plans, increased this percentage to 13%.

All variables except age were coded as "dummy" variables, with the reference level indicated in parentheses in Table 4. The b_i coefficients indicate the change in log odds, contributed by each variable, of being in the group that changed graduation plans; while the e^b coefficients are the factors by which each variable changes (multiplies) the odds ratio: that is, the ratio of the probability of having changed graduation plans to the probability of having originally planned to graduate. Positive b_i coefficients (and e^b greater than 1) increase the likelihood of the graduate being in the group that had changed plans, while negative coefficients make it less likely the graduate had changed plans.

For example, if transfer plans are not considered (Model 1), each additional year of age decreases the log odds of the graduate having changed plans by .0149, and by .0164 if transfer plans are in the equation (Model 2). Graduates who took math during their first year were more likely to have been in the group that changed plans. The odds of being in that group were only two thirds as

high for graduates who waited until later to take math (e^b = .67, both models, if enrolled in first math course after first year).

Table 4. Logistic Regression Coefficients (b_i) for Change in Graduation Plans (A.A./A.S. Graduates)

	Model 1--Transfer Excluded			Model 2--With Transfer Variable		
Variables[1]	**b**	***s.e. b***	**e^b**	**b**	***s.e. b***	**e^b**
Age	-.0149	*.0154*	.9852	-.0164	*.0155*	.9837
When Enrolled in First Math (1st Year)						
After First Year	-.3991**	*.1100*	.6709	-.4047**	*.1117*	.6672
Level of First Math Course (Remedial)						
Specialized Occupational	2.2196*	*.8591*	9.2037	2.4485**	*.8766*	11.5715
Algebra Prep	.9569	*.6109*	2.6037	.9141	*.6103*	2.4945
College Algebra and Related	-.4454	*.6847*	.6406	-.2096	*.6930*	.8109
Calculus	2.2686*	*1.1206*	9.6657	2.3060*	*1.1236*	10.0338
Level of First Math Course x Age						
Specialized Occupational	-.0631**	*.0354*	.9389	-.0719*	*.0361*	.9307
Algebra Prep	-.0282	*.0248*	.9722	-.0260	*.0247*	.9744
College Algebra and Related	.0464**	*.0281*	1.0475	.0380	*.0285*	1.0387
Calculus	-.0631	*.0467*	.9389	-.0620	*.0468*	.9399
Transfer Plans (Planned to Transfer)						
No Information				.6211**	*.1170*	1.8609
Did **Not** Plan to Transfer				.8269**	*.1421*	2.2862
Constant	-.4547	*.4124*		-.8645*	*.4210*	
Model 1 chi-square 68.96** (*df* = 10)				Model 2 chi-square 113.13** (*df* = 12)		
66% of cases correctly classified with Model 1				66% of cases correctly classified with Model 2		
97% who did plan to graduate were correctly classified				**94%** who did plan to graduate and		
7% who did **not** plan to graduate were correctly classified				**13%** who did **not** plan to graduate		

NOTE: Changing graduation plans (initially planning **not** to graduate), coded 1; planning to graduate, coded 0.

[1] Reference category in parentheses for dummy-coded independent variables.

* $p < .05$

** $p < .01$

No interactions of transfer plans with other variables made a significant contribution to the model. The effect of transfer plans for students who at time of admission planned to transfer (the reference category) may be seen by comparing the coefficients of the two models and noting how

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small the differences are. If the student did not plan to transfer, however, or if transfer information was not available,[6] the student was more likely to be in the group that did not plan to graduate (b_i = .8269 and .6211, respectively)--the odds doubled or nearly doubled (e^b = 2.2862 and 1.8609, respectively), and this, irrespective of age or level and timing of first math course.

The effect of level of the first math course is more complex, because each level is contrasted to those who began in remedial math and because it interacts with age. To assist in visualizing the effects of all variables at once, Figures 1 through 5 show each level of first math class and the probability of being in the group that changed graduation plans.

[Insert Figures 1 through 5 about here.]

The generally downward slope from younger to older graduates (except for those beginning in college algebra and related courses) indicates that it is the younger graduates who were likely to enter school with no plans to graduate. For every level of math, those who did not plan to transfer have higher probabilities of having changed graduation plans, for all ages and no matter when they took their first math course. Also those who took math their first year were more likely to have changed plans, for all ages and whether or not they planned to transfer. Those that took math their first year and did not plan to transfer had the highest probabilities for being in the group that changed graduation plans, across all ages. Beginning in either remedial math (Figure 1) or algebra prep (Figure 3) yielded the least likelihood of being in the group that changed plans.

[6] This question was first asked in 1993; graduates who were admitted prior to 1993 (39% of this sample) do not have transfer plans recorded.

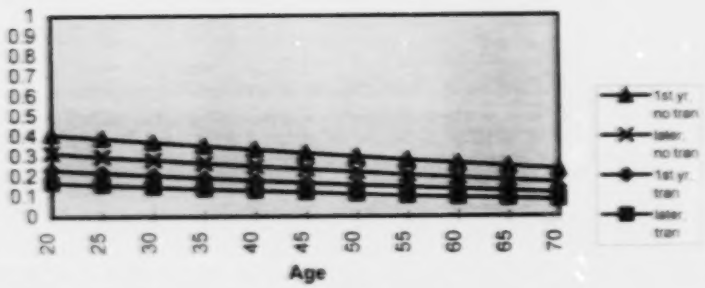

Figure 1. Probability of Changing Plans--Remedial Math

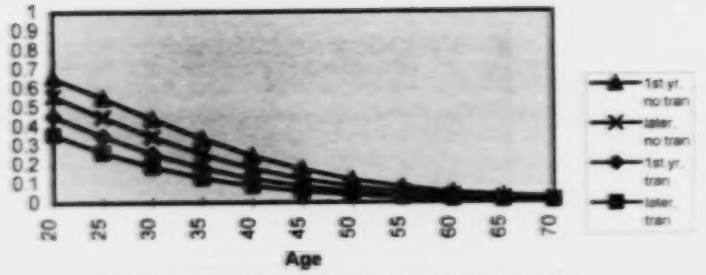

Figure 2. Probability of Changing Plans--Specialized Occupational Math Courses

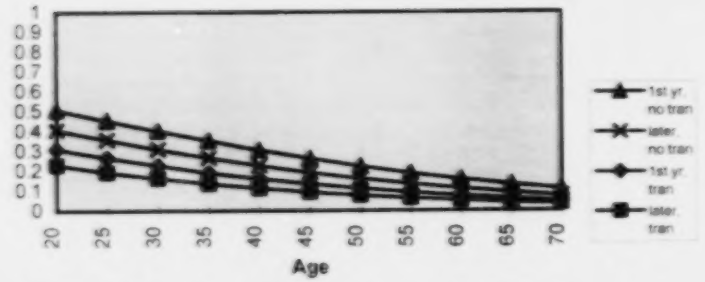

Figure 3. Probability of Changing Plans--Algebra Prep

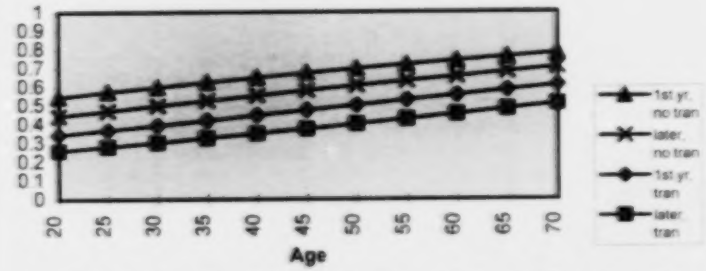

Figure 4. Probability of Changing Plans--College Algebra and Related Courses

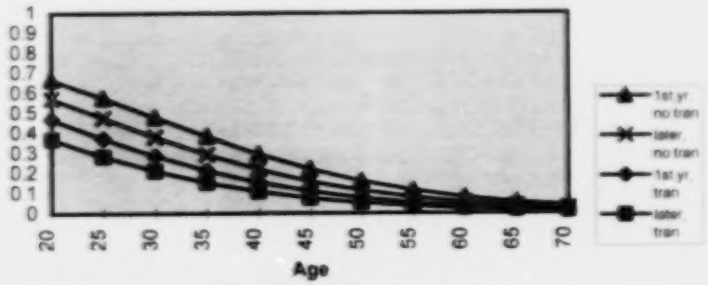

Figure 5. Probability of Changing Plans--Calculus

The students who began in college algebra and related courses (Figure 4) are an interesting exception to the pattern for other math courses. The courses in this group included math for students planning to major in elementary education, social or behavioral sciences, and biology, as well as standard college algebra. The older the student who began in one of these courses, the more likely they were to have changed graduation plans. For students fifty years of age who took one of these courses during their first year and had no plans to transfer, the probability of being in the group that had originally planned not to graduate (but did) was 70%.

A.A.S. (Occupational) Graduates

The variables that correlate with change in graduation plans for students who completed an Associate in Applied Science degree were different from those for A.A. and A.S. graduates. For these graduates it was performance in their first math class--the impact of which differed by gender. The likelihood of changing plans also differed by type of program; those in programs in the business division were more likely to have changed plans than those in programs in the health and technology divisions. Age, ethnicity, transfer plans, and level of first math course were unrelated to graduation plans, as were all variables associated with first English composition course. Table 5 shows the logistic regression coefficients and model statistics for A.A.S. graduates. The overall fit of the model leaves much to be desired. Seventy-five percent of cases were correctly classified into graduation plan group, all of them graduates who had planned to graduate. Figure 6 shows the results in graphic form. Because the probability of changing plans for students in the technology division was just a few hundredth points different from those of students in the health division, data for these two divisions were combined in order to simplify the graphical presentation.

Table 5. Logistic Regression Coefficients (b_i) for Change in Graduation Plans (A.A. S. Graduates)

		A.A.S. Model	
Variables[1]	**b**	***s.e. b***	**e^b**
Math Success--Males (Fail)			
A	-.0594*	*.4489*	.9423
B or C	.1053	*.3922*	1.1110
No Math	.4180	*.4268*	1.5189
Math Success--Females			
A	-.7327	*.4065*	.4806
B or C	.0399	*.3804*	1.0407
Fail	-1.0212	*.5903*	.3602
No Math	-.0310	*.4200*	.9695
Division (Health)			
Technology	-.0804	*.2770*	.9227
Business	.4481*	*.1920*	1.5654
Constant	-1.1833	*.3748*	

Model chi-square 28.25** ($df = 9$)

75% of cases correctly classified with Model
100% who did plan to graduate were correctly classified
0% who did not plan to graduate were correctly classified

NOTE: Changing graduation plans (initially planning **not** to graduate), coded 1; planning to graduate, coded 0.
[1] Reference category in parentheses for dummy-coded independent variables.
* $p < .05$
** $p < .01$

All three variables--gender, program division, and grade in initial math course--are represented in Figure 6. Students in the business division, represented by the solid lines, were more likely to have changed graduation plans than were students in the combined technology and health divisions, represented by dashed lines. Males (lines with triangles) were more likely to have changed plans than were females (lines with circles). Grade in first math course affected likelihood of changing graduation plans fairly uniformly for males, although **not** taking math (at this school) made it more likely the student had changed plans. Females, by contrast, varied in probability by initial math grade. Those who received a satisfactory, but not an A grade, were

more likely to be in the group that changed plans; while those with either an A or an unsatisfactory performance (D, F or withdraw) were far less likely to have changed plans--just 10 to 20 percent, depending on division.

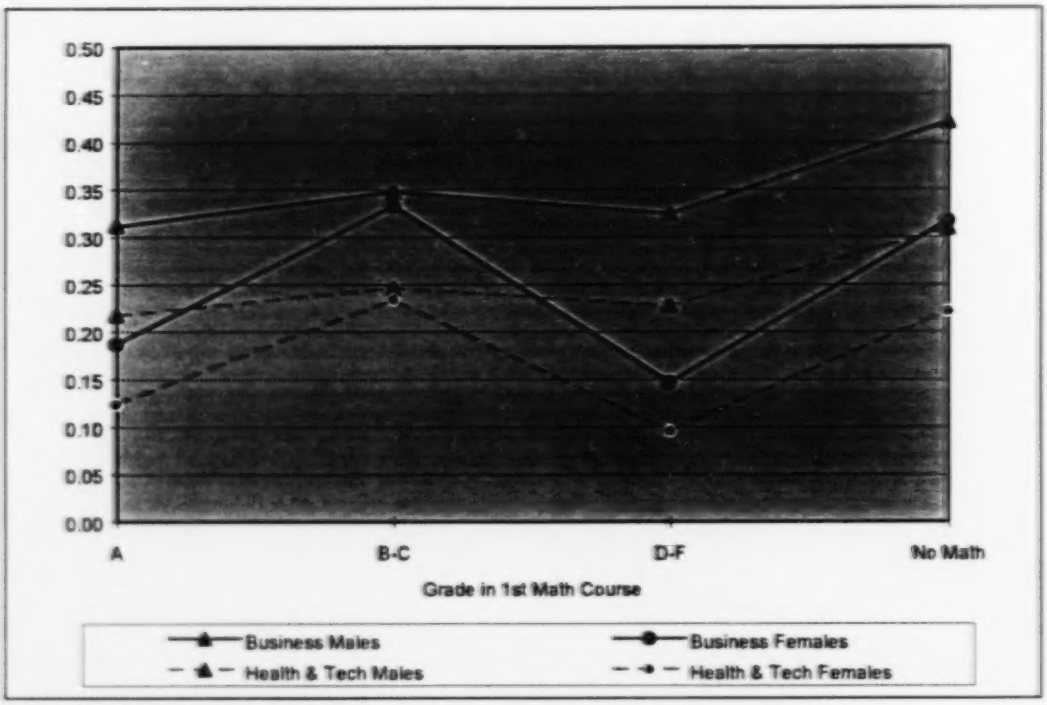

Figure 6. Probability of Changing Plans--A.A.S. Graduates

Conclusion

The models do not plumb deeply into the motivations of graduates who changed their minds about graduation. Yet they do provide some tantalizing hints. For A.A./A.S. graduates, those most likely to have changed their minds about graduation were young, did not plan to transfer, took math in their first year, and did not start in algebra prep or remedial math. It is tempting to hypothesize that taking the initial math course early on is one way of conferring membership into a formal "academic community," enhancing a student's academic integration (Tinto, 1993). But

it may also be a case of Pascarella and Terenzini's "conditional effects of college." (1991) That is, perhaps early math takers are recruited from a different sub-set of students, science majors, possibly; and that these students are more likely to change their minds about obtaining an associate degree. The differences associated with age are another conditional effect.

It is interesting that variables associated with English course taking did not contribute significantly to the models while math course variables did. Terenzini, et. al. (1995) found that number of composition courses dropped out of a regression model predicting critical thinking development--while number of math courses remained a viable predictor. This might be understood in light of what Astin termed "the curricular trade-offs involved in the undergraduate experience." (1993; p. 130) His analysis of data from the 500,000 college students participating in the Cooperative Institutional Research Program (CIRP) found that self-rated writing skills were negatively associated with number of math and science courses taken. The implication is that these skills are, to a certain extent, mutually exclusive.

The meager explanatory power contributed by the variables in the present study illustrates the utility of a theoretical model. Using Tinto's Model Of Institutional Departure, the direction for future investigation is suggested. Data on academic and social integration, entirely missing from the present study, may clarify the role and action of initial math course on the decision to change graduation plans. In their comprehensive review of the empirical support for Tinto's Model, Braxton, Sullivan, and Johnson (1997) found support for the association between academic integration, later goal committments, and outcome in studies of community colleges. Bers and Smith (1991) found integration variables did discriminate between community college persisters and non-persisters, net of other variables. Faculty-student and peer interactions are suggested by the model as areas for investigation, as well.

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